Claims

1.   A method for producing a conditionally-immortalized human mesencephalon neural precursor cell, comprising:

(a)   transfecting human mesencephalon cells plated on a first surface and in a first growth medium that permit proliferation with DNA encoding a selectable marker and an externally regulatable growth-promoting gene; and

(b)   selecting the transfected cells on a second surface and in a second growth medium that permit attachment and proliferation, and therefrom producing a conditionally-immortalized human mesencephalon cell.

2.   The method of claim 1 wherein the first and second surfaces are independently selected from the group consisting of substrates comprising one or more of a polyamino acid, fibronectin, laminin or tissue culture plastic.

3.   The method of claim 1 wherein the growth-promoting gene is an oncogene.

4.   The method of claim 3 wherein the oncogene is v-myc.

5.   The method of claim 1 wherein expression of the growth-promoting gene is inhibited by tetracycline.

6.   A conditionally-immortalized human mesencephalon neural precursor cell capable of differentiation into neurons.

7.   A conditionally-immortalized human mesencephalon neural precursor cell according to claim 6, wherein the cell is capable of differentiation into dopaminergic neurons.

8.   A conditionally-immortalized human mesencephalon neural precursor cell according to claim 6, wherein the cell is capable of differentiation into GABA-ergic neurons

9.   A method for producing neurons, comprising culturing a cell produced according to claim 1 under conditions inhibiting expression of the growth-promoting gene.

10.   A method according to claim 9, wherein the cell is cultured in medium comprising tetracycline.

11.   A method according to claim 9, wherein the cells are cultured in the presence of one or more differentiating agents.

12.   A method according to claim 11, wherein the differentiating agent is selected from the group consisting of forskolin, GDNF, CTNF, IGF-I and BDNF.

13.   A neuron produced according to the method of claim 9.

14.   A dopaminergic neuron produced according to the method of claim 9.

15.   A GABA-ergic neuron produced according to the method of claim 9.

16.   A method for transplanting a human mesencephalon cell into a mammal, comprising administering to a mammal a cell produced according to the method of claim 1 or claim 9.

17.   A method for treating Parkinson's disease in a patient, comprising administering to a patient a cell produced according to the method of claim 1 or claim 9.

18.   A method for screening for an agent that modulates an activity of a protein produced by a human mesencephalon cell, comprising: ·
(a)   contacting a cell produced according to the method of claim 1 or claim 9 with a candidate agent; and
(b)   subsequently measuring the ability of the candidate agent to modulate an activity of a protein produced by the cell.

19.   A method for detecting the presence or absence of a protein in a sample, comprising:
(a)   contacting a sample with a cell produced according to the method of claim 1 or claim 9; and
(b)   subsequently detecting a response in the cell, and therefrom detecting the presence of a protein in the sample.

20.   A method for identifying a human mesencephalon gene or protein, comprising detecting the presence of a gene or protein within a culture of cells produced according to the method of claim 1 or claim 9.

21.   A method for screening for an agent that affects human mesencephalon cell death, comprising:

(a)   contacting a cell produced according to the method of claim 1 or claim 9 with a candidate agent under conditions that, in the absence of candidate agent, result in death of the cell; and

(b)   subsequently measuring the ability of the candidate agent to affect the death of the cell.

22.   A method for screening for a protein that regulates human mesencephalon cell death, comprising:

(a)   altering the level of expression of a protein within a cell produced according to claim 1 of claim 9; and

(b)   subsequently measuring the effect of the alteration on the death of the cell, and therefrom identifying a protein that regulates human mesencephalon neural precursor cell death.

23.   A conditionally-immortalized human mesencephalon neural precursor cell produced according to the method of claim 1.

24.   A cell according to claim 23, wherein the cell is present within a clonal cell line.

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